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SILVICAL LEAFLET 25.

COTTONWOOD.

Populus deltoides, Marsh.

Cottonwood is one of the most rapidly growing and most widely distributed of American trees. It attains its greatest importance in the region between the Mississippi River and the Rocky Mountains, especially in the poorly timbered plains region. The wood is light, weak, and not very durable, but rather even-grained and easily worked. It is used for pulpwood, veneer, wagon bodies, and boxwood material, and owing to the scarcity of other timber in the plains region it is much used there for posts and fuel. It has been planted extensively for wind-breaks, and on account of rapid growth and ease of propagation it is very widely used as a shade tree.

RANGE AND OCCURRENCE.

Cottonwood is widely distributed. It is found from Quebec to New Mexico, and from southern Alberta to western Florida. The Rocky Mountain territory from Alberta to New Mexico is the range of *P. occidentalis*, which is so similar to *P. deltoides* as to be regarded by some authorities as a form of it. East of the Allegheny Mountains from Maryland to western Florida cottonwood is not common, and near the coast or at very low elevations it is usually present only as scattered individuals. In the Mississippi Valley region it is common along river bottoms and slopes at low altitudes. In the progress westward in the plains region it is found at gradually higher altitudes, but still always along streams or where the water table is near the ground surface. In the Rocky Mountains it maintains its position near streams, but at altitudes of from 4,000 to 9,000 feet.

CLIMATE.

Cottonwood endures a considerable diversity of climatic conditions, from the dry climate of the Dakotas and Alberta, where rainfall may be as low as 12 or 15 inches a year, and winter temperatures as low as -45° F. to the humid, warm climate of the lower Mississippi River region, with summer temperatures as high as 105° and a precipitation of 55 inches or more.

ASSOCIATED SPECIES.

In the East cottonwood is a scattering tree. In the Piedmont Plateau it occurs here and there, usually along streams or on slopes near by, associated with sycamore, hackberry, hornbeam, and black jack oak, often in small groups and clumps, but never in dense stands over large areas. Its best development is attained in the bottoms along the Mississippi River, in Arkansas, Tennessee, Mississippi, Missouri, and Kentucky. Here it is found on the sand bars or river banks in pure stands of considerable extent, and sometimes very dense. Farther west, the typical scattering growth along streams is found, and while it never forms large stands, it is found on almost all river bottoms throughout the plains States, associated in the south with boxelder, green ash, white and red elms, honey locust, black willow, post oak, pecan and bitternut hickories, and in the north with sand-bar willow, balm of Gilead, narrowleaf cottonwood, boxelder, green ash, and paper birch. In the Rockies it associates with Fremont cottonwood, paperleaf alder, western birch, black cottonwood, and longleaf and mountain willows.

HABIT.

In dry, upland sites, or in open, exposed places, cottonwood is small, branchy, and irregular in form. Under favorable conditions, with plenty of soil moisture and fairly good soil, and in close stands, average heights of 75 feet and diameters of from 2 to 3 feet are by no means unusual, while a very few trees more than 100 feet in height and 5 or 6 feet in diameter have been reported. The bark is a gray-green in color. It is somewhat ridged in youth, and becomes deeply furrowed as the tree grows older. The root system is variable. Usually it has strong laterals, and a deep taproot, especially in moderately dry, porous soil.

SOIL AND MOISTURE.

The chief requirement of cottonwood is soil moisture. Many plantations where the soil was fertile and the planting properly done have been unsuccessful merely because the soil was too dry. On the other hand, if soil moisture is plentiful and the soil well drained and porous, not swampy, cottonwood will endure considerable variation of temperature and slight atmospheric humidity, and will thrive on extremely poor soils or almost pure sands.

GROWTH AND LONGEVITY.

The growth of cottonwood is rapid. In early life, under favorable conditions, annual increases of 5 feet in height and 1 inch in diameter are common. A great many measurements taken in Nebraska under moderately favorable conditions indicate that an average height growth of from 2 to 3½ feet per year, and a diameter growth of from

one-half to three-fourths of an inch may be expected for the first 25 or 30 years. These measurements were taken in planted groves on fair to good soil, in close stands.

Like most of the poplars, the cottonwood is a short-lived tree; the growth falls off rapidly after 30 or 40 years, and a tree seldom lives to be more than 80 years old. The foliage is very thin and the shade underneath the typical open stands is so light that any but exceedingly intolerant species can endure it. It is therefore generally an advance growth preparing the way for a more permanent type of forest.

TOLERANCE.

From early youth to maturity cottonwood requires full light to develop properly. A dense growth, however, is beneficial if posts or lumber are desired, as the side shading reduces the excessive branchiness of the bole. Cuttings placed in full, open sunlight will thrive if the soil moisture is sufficient.

REPRODUCTION.

The cottonwood is dioecious, so that only the pistillate trees reproduce by seed. It is a prolific seeder. Along sand bars reproduction from seed is often very dense, but throughout the plains region it is very slight, except close to the streams in the river bottoms. Cuttings and suckers will both grow rapidly and make large trees. The sprouting capacity of young trees is very good.

MANAGEMENT.

Cottonwood is especially well adapted to farmers' woodlots in regions where timber is scarce and dear. Its quick growth adapts it to short rotations for posts and fuel, or it can be managed under longer rotations for the production of saw timber, in which case the thinnings can be utilized for posts and fuel. Reproduction can be secured quickly and cheaply by means of cuttings, and sometimes also by sprouts.

